FOR SERVICE TECHNICIAN'S USE ONLY

Tech Sheet **Do not Discard**

⚠ WARNING

Electrical Shock Hazard

Disconnect power before servicing.

Replace all parts and panels before operating.

Failure to do so can result in death or electrical shock.

⚠ DANGER

Electrical Shock Hazard

Only authorized technicians should perform diagnostic voltage measurements.

After performing voltage measurements, disconnect power before servicing.

Failure to follow these instructions can result in death or electrical shock.

Voltage Measurement Safety Information

When performing live voltage measurements, you must do the following:

- ☐ Verify the controls are in the off position so that the appliance does not start when energized.
- ☐ Allow enough space to perform the voltage measurements without obstructions.
- ☐ Keep other people a safe distance away from the appliance to prevent potential injury.
- ☐ Always use the proper testing equipment.
- ☐ After voltage measurements, always disconnect power before servicing.

No-Load Performance, Controls in Normal Position

	Kw/24 hr ±0.4	Percent Run Time ±10	Cycles/24 hr ±10	Refrigerator Compartment Average Food Temperature ±4°F	Freezer Compartment Average Food Temperature ±4°F
Ambient °F	70° 90° 110°	70° 90° 110°	70° 90° 110°	70° 90° 110°	70° 90° 110°
	.95 1.50 2.1	35 50 70	30 30 30	38 38 38	0 0 0

Temperature Relationship Test Chart

	Evaporator Outlet ±3°F	Evaporator Inlet ±3°F	Suction Line ±10°F	Average Total Wattage ±20%	Suction Pressure ±3 PSIG	Head Pressure ± 5 PSIG
Ambient °F	70° 90°	70° 90°	70° 90°	70° 90°	70° 90°	70° 90°
	-18 -15	-18 -15	75 95	110 120	-2 0	100 140

Component Specifications

Component	Specifications all parts 115VAC/60HZ unless noted	
Compressor	BTUH Watt Current Lock rotor Current Full load Resistance Run windings Resistance Start windings	660 BTUH Embraco EM2Y60 60 Hz / 117 watts 10.8 amps± 15% 1.60 amps± 15% 4.75 ohms± 8% 6.1 ohms± 8%@77°F
Relay		TSD2/5aP
Compressor run capacitor	Volt Capacitance	180 VAC 12 µfd ± 10%
Electric damper control	Maximum closing time Temperature Rating RPM	8 seconds 20°F- 110°F 5
Thermistor	Temperature 77°F 36°F 0°F	Resistance 10,000 ohms± 1.8% 29,500 ohms± 1.0% 86,300 ohms± 1.8%
Condenser motor	Rotation (facing end opposite shaft) RPM Watt Current	Clockwise 1120 RPM 3.4 watts±15%@115VAC 0.085 amps± 15%@115VAC
Evaporator fan motor	Rotation (facing end opposite shaft) RPM Watt Note: Fan blade must be fully seated on shaft to achieve proper airflow.	Clockwise 2800 RPM 3.7 or 6.0±15% watts@115 VAC
Overload/Relay	Ult. trip amps @ 158°F (70°C) Close temperature Open temperature Short time trip (seconds) Short time trip (amps @77°F (25°C)	2.74 amps± 15% 142°F ±16° 248°F ±9° 10 seconds ±5 12 amps ±2amps
Thermostat (Defrost)	Volt Watt Current Resistance across terminals: Above 42°F ±5° Below 12°F ±7°	120/240 VAC 495 watts 10/5 amps 56 K ohms Open Closed
Evaporator heater (19 Cu. Ft)	Volt Wattage Resistance	115 VAC 395 ±5% watts @ 115VAC 33 ±5% ohms
Evaporator heater (22 Cu. Ft)	Volt Wattage Resistance	115 VAC 435 ±5% watts @ 115VAC 30 ±5% ohms
Evaporator heater (20, 25 Cu. Ft)	Volt Wattage Resistance	115 VAC 470 ±5% watts @ 115VAC 28 ±5% ohms
Control board	Volt See control board section for diagnostics	120 VAC,60HZ
Water Valve, dual (if equiped)	Volt Wattage	120 VAC 35 watts (Brown Coil) 20 watts (Yellow Coil)
Light switch	Type Volt Current	SPDT NC 125/250 VAC 8 / 4 amps
Light switch / Interlock	Type Volt Current	SPDT NO/NC 125/250 VAC 8 / 4 amps

Control board Troubleshooting

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Programming Mode:

Note: The Program Code is located on the Serial Plate on this unit after the word Code.

1. Open the Fresh Food door and hold the Fresh Food door light switches closed while pushing the Freezer Temperature DOWN /- Key pad 3 times consecutively.

Note: The 3 Keystrokes must be done consecutively and within 10 seconds.

2. Release the Fresh Food door light switch.
3. The control will display **P - E** to confirm entry into the programming mode.
4. Entry is confirmed by pressing the Freezer Temperature DOWN /- key once more.

Note: All control functions will be turned off (Compressor, Defrost, Evaporator Fan, the damper will remain in its current position).

5. The control will display the current Program Code. This value should be validated with the Program Code printed on the unit serial plate.

Note: If the Program Code is correct, the Programming Mode is exited by closing the Refrigerator door(s).

6. To set the desired Program Code number press the Freezer and Refrigerator UP /+ keys. The corresponding digit will be advanced with each key press.
7. Once the desired Program Code is displayed, press the Freezer Temperature DOWN /- Key until the Program Code begins flashing indicating it has been saved.

Note: If you attempt to enter an invalid Program Code the control will not save the new code, but will flash the old code and this will be displayed. (The unit will NOT run with a Program Code of **OO**).

8. Once the Program Code has been saved the Programming Mode is exited by closing the Refrigerator door(s). If the new code is incorrect this process should be repeated after closing the Refrigerator door(s).

The Programming mode can be exited at any time by closing the Refrigerator Door(s).

Defrost Operation:

The Control Board adapts the compressor run time between defrosts to achieve optimum defrost intervals by monitoring the length of time the defrost heater is on.

After initial power up, defrost interval is 4 hours compressor run time. Defrost occurs immediately after the 4 hours.

Note: Once unit is ready to defrost there is a 4 minute wait time prior to the beginning of the defrost cycle. Optimum defrost is 15 minutes. Each additional minute the defrost thermostat remains closed, 1 hr. is subtracted from the previous defrost interval. Each minute the thermostat opens prior to optimum defrost, it extends the next defrost interval 1 hr. When defrost thermostat opens there is a 4-6 minute drip time before compressor restarts or Control Board will terminate defrost at 25 minutes if defrost thermostat has not opened and will reset the defrost interval to the 8 hr. minimum setting.

4 hours of continuous compressor run resets the next defrost interval to 8 hours and will initiate a defrost, if 8 hours of compressor run time has also occurred.

Forced Defrost Mode:

The forced defrost function is performed using the refrigerator display and keypad. Enter the Forced Defrost Mode by performing the following sequence of events:

1. Hold the refrigerator door light switch closed.
2. Press the Refrigerator Temperature DOWN /- keypad 3 times consecutively.

Note: The 3 keystrokes must be consecutive and within 10 seconds.

3. Release the refrigerator door light switch.
4. The control will display **F- d** to confirm entry into the Forced Defrost Mode.
5. Entry is confirmed by pressing the Refrigerator Temperature DOWN /- key once more. The unit is off and in the Defrost Mode.

Note: All control functions will be turned off (Compressor, Defrost, Evaporator Fan, the damper will remain in its current position).

6. The control will default to the short run period test.

Note: You can toggle between the **S** Short and **L** Long test mode by pressing the Refrigerator Temperature UP /+ Key. Long Test mode is used for factory test and should not be used in the field.

7. Once the desired mode is displayed, confirm the forced defrost by pressing the Refrigerator Temperature DOWN /- Key once. The defrost will begin immediately and the display will return to a normal operating display with set point values.
8. Close the Refrigerator door(s). You are in the defrost mode.

Note: Forced Defrost mode can be exited at any time prior to step 7 by closing the Refrigerator Door(s).

Service Test Mode:

The service test functions are performed using the Refrigerator Temperature Display and Keypad. Enter the Service Test Mode by performing the following sequence of events:

1. Hold the refrigerator door light switch closed.
2. Press the Refrigerator Temperature UP /+ keypad 3 times consecutively.

Note: The 3 keystrokes must be done consecutively and within 10 seconds.

3. Release the refrigerator door light switch.
4. The control will display **S - E** to confirm entry into the service mode.
5. Entry to the Service Menu is confirmed by pressing the Refrigerator UP /+ key once more.
6. The control will display its software version for 3 seconds.
7. Following the software revision display the freezer display will read the first test number in the diagnostic tree. The refrigerator display will be blank.

Note: All control functions will be turned off (Compressor, Defrost, Evaporator Fan, the damper will remain in its current position).

8. You are now in the SERVICES TEST operational mode and may use the diagnostic tests.

The Service Test Mode can be exited at any time by closing the Refrigerator Door(s).

The Freezer Temperature UP /+ DOWN /- keys allow selection of the test to be performed.

Service Test 1 - Defrost Thermostat & Defrost Circuit Test

When selected this test will display the state of the defrost thermostat. In order to perform this test the defrost heater will be energized. The test is activated and deactivated using the Refrigerator Temperature UP /+ key. Once activated, this test must be deactivated to move to another test number.

This test also allows observation and measurement of proper defrost function. You can observe defrost heat and voltages while the test is activated. For Defrost Thermostat (Open), freezer displays **1** and refrigerator displays **O** For Defrost Thermostat Shorted (Closed), freezer displays **1** and refrigerator displays **S**.

Service Test 2 - Compressor/Condenser Fan Test

When selected and activated this test will operate the Compressor/Condenser Fan circuit. You should evaluate proper operation of the compressor and condenser fan. The Refrigerator Temperature UP /+ key will toggle between **O / F** (ON & OFF) the compressor drive circuit. The test must be "deactivated" or in the OFF position to move to another test selection. Observe Compresser and Condenser Fan Function. Freezer displays **2** Refrigerator displays **0** (ON) or freezer displays **2** and refrigerator displays **F (OFF)**.

Service Test 3 - Evaporator/Freezer Fan Test

When selected and activated this test will operate the freezer fan. The Refrigerator Temperature UP /+ key will toggle between **O / F** (ON & OFF) the fan drive circuit. You will have to inspect the fan for proper function. The test must be "deactivated" or in the OFF position to move to another test selection. Observe Fan Operation. Freezer displays **3** - Refrigerator displays **O** or **F**.

Service Test 4 - Fresh Food Thermistor Test

When selected the refrigerator displays **P**=Pass, **O**=Open, **S**=Short result for a test on the Fresh Food Thermistor circuit. The test is activated and de-activated via the Refrigerator Temperature UP /+ key, and must be de-activated to move to another selection. Freezer displays 4 - Refrigerator will be **P**, **O** or **S**.

Service Test 5 - Freezer Thermistor Test

When selected the refrigerator displays **P**=Pass, **O**=Open, **S**=Short result for a test on the Freezer Thermistor circuit. The test is activated and de-activated via the Refrigerator Temperature UP /+ key, and must be de-activated to move to another test selection. Freezer displays 5 - Refrigerator will be **P**, **O** or **S**.

Service Test 6 - Open Damper Test

When selected and activated this test will indicate the current position **O / C** (OPEN / CLOSED) of the refrigerator damper. The Refrigerator Temperature UP /+ key will toggle the damper open and closed. You must allow 1 minute for each attempt to change the damper position. You should observe proper damper function. Freezer displays 6 - Refrigerator will be **O** or **C**.

Note: Adjustments of Service Test 7 or Service Test 8 will alter the performance of the unit.

Service Test 7 - FF Performance Adjustment

This test will allow adjustment of the control performance points. Each step will incrementally change the Refrigerator performance warmer 1° towards **1** or colder 1° towards **9** as adjusted. The default value is **5**. The Refrigerator Temperature UP /+ and DOWN /- keys are used to adjust the Performance Offset value.

WARMER <(1 2 3 4 (**5**) 6 7 8 9)> COLDER

The last FF Performance Offset value displayed before leaving test 7 will be saved when the refrigerator door(s) is closed.

Service Test 8 - FZ Performance Adjustment

This test will allow the adjustment of the control performance points. Each step will incrementally change the Freezer performance **1° warmer towards (1)** or **1° colder towards (9)**. The default value is 5. The Refrigerator Temperature UP /+ and DOWN /- keys are used to adjust the Performance Offset value.

WARMER <(1 2 3 4 (**5**) 6 7 8 9)> COLDER

The last FZ Performance Offset value displayed before leaving test 8 will be saved when the refrigerator door(s) is closed.

Service Test 9 - Defrost Adjustment

This test will allow the adjustment of the defrost interval from adaptive defrost time to a fixed defrost time. The Refrigerator Temperature UP/+ key will toggle from **(A) Adaptive** to **(F) Fixed**, 6 hour defrost time. Default setting is Freezer displays **9** - Refrigerator displays **A**. For Fixed Defrost Freezer displays **9** - Refrigerator displays F.

Schematic

Rev: A

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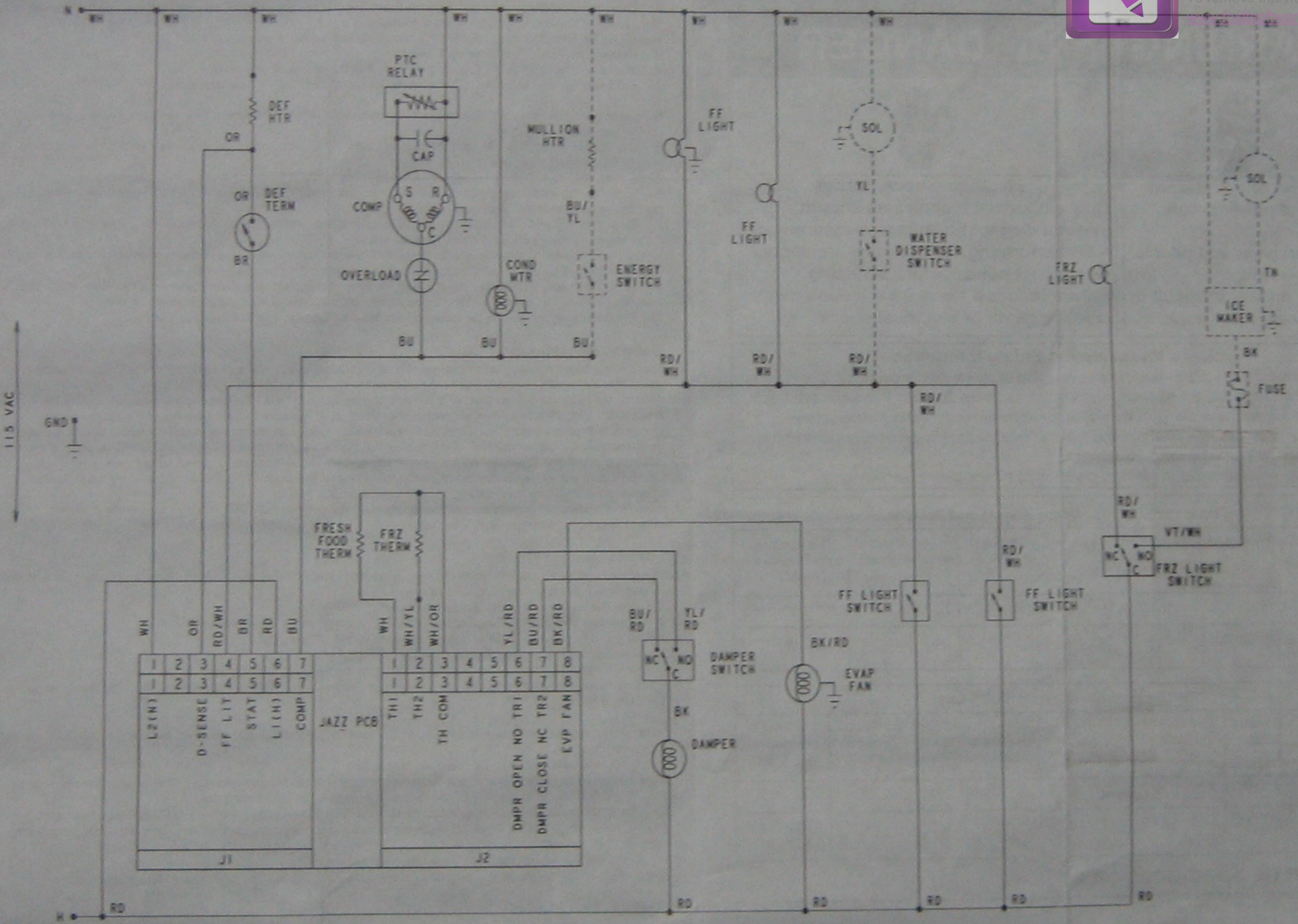

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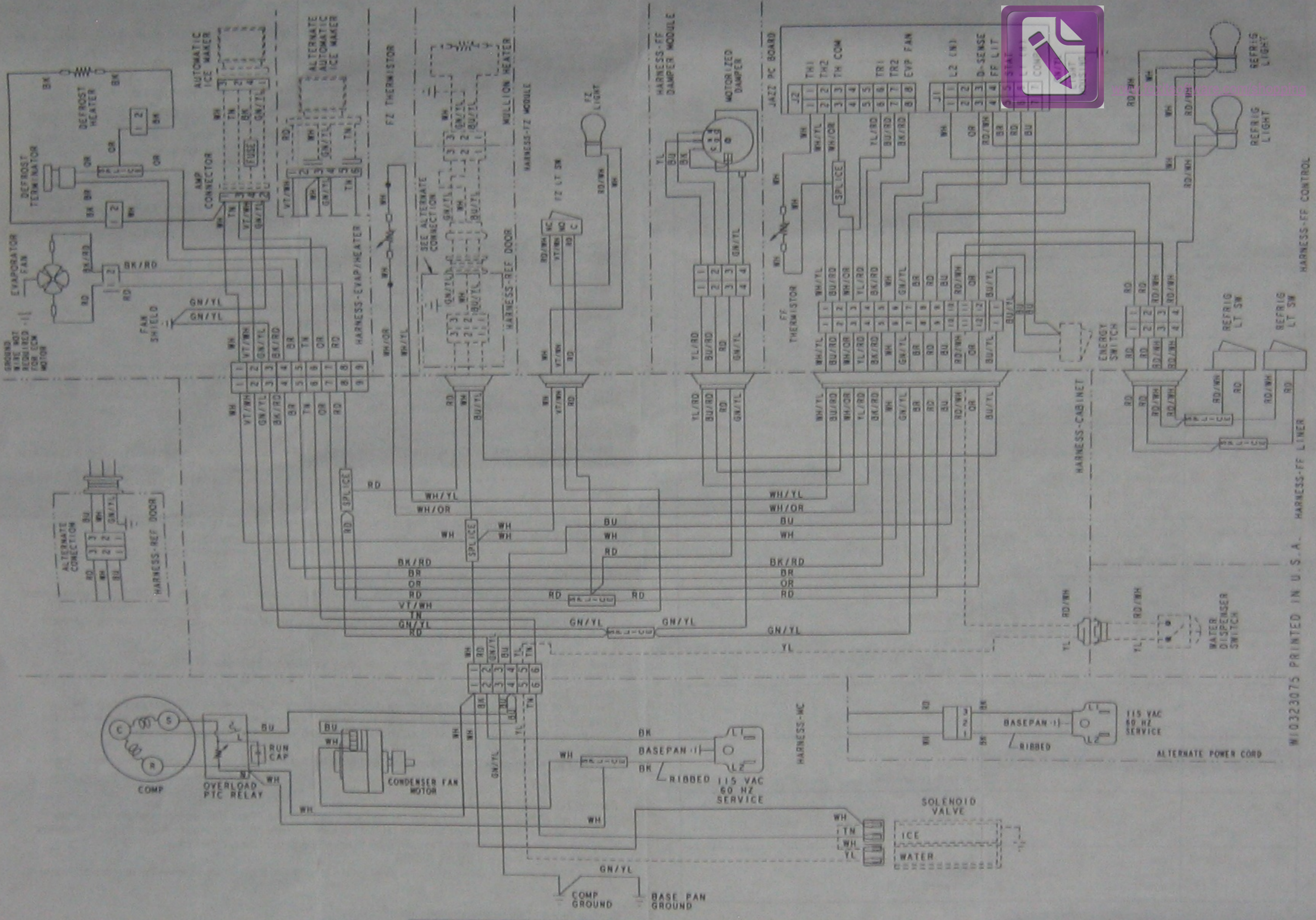
Wiring Diagram

Rev: A



NOTE: This sheet contains important Technical Service Data.

FOR SERVICE TECHNICIAN ONLY

DO NOT REMOVE OR DESTROY

JZ 19-22 2 door & FD 5/10

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